

Photocatalytic and Adsorptive System for Odor Control in Lunar Surface Systems Using Silica-Titania Composites, Phase II

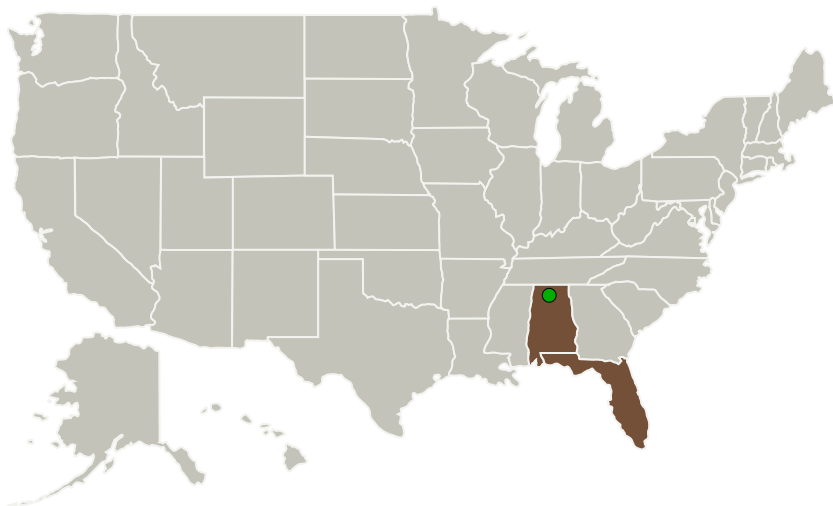
Completed Technology Project (2010 - 2012)



Project Introduction

The work proposed herein focuses on waste subsystems with emphasis on odor control associated with volatile organic compounds (VOCs). The development of efficient odor removal systems for use inside lunar architectures is one of NASA's critical needs (2008 SBIR Topic X2.03). Because of the limited space and resources in both exploration vehicles and non-moving habitats, a treatment system must be compact, lightweight, and robust, and have low energy and material input requirements, with focus on reducing equivalent system mass (ESM). We have developed a novel, robust, and highly effective Silica-Titania Composite (STC) technology capable of adsorbing and oxidizing VOCs to harmless byproducts when irradiated with UV light. The effectiveness of the technology for removal of ethanol from air when irradiated continuously with UV was proven under Phase I. This Phase II proposal will focus on the design, fabrication, and evaluation of a prototype employing the STC technology with UV LEDs as the light source, challenged with several VOCs simultaneously. The prototype will be designed based on the requirements of the Lunar Habitat in NASA's Lunar Outpost mission. Revised ESM calculations will be completed after system optimization, and a final prototype will be delivered to NASA for future testing.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Sol-gel Solutions, LLC	Lead Organization	Industry	Gainesville, Florida
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Florida

Project Transitions

January 2010: Project Start

July 2012: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139331>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sol-gel Solutions, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

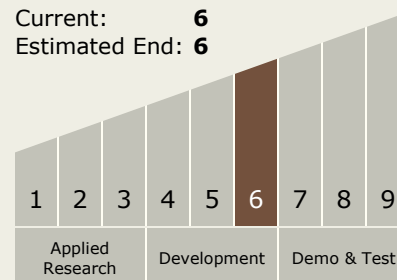
Carlos Torrez

Principal Investigator:

Rick Loftis

Technology Maturity (TRL)

Start: 6
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
 - └ TX06.1.1 Atmosphere Revitalization

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System